GOVERNMENT OF INDIA
SPACE
LOK SABHA

UNSTARRED QUESTION NO:3730
ANSWERED ON:09.08.2017
Electrical Propulsion
Galla Shri Jayadev

Will the Minister of SPACE be pleased to state:

(a) whether Indian Space Research Organisation (ISRO) is gearing up to incorporate electrical propulsion as an alternative to the use of chemical propellants;
(b) if so, the details thereof and how electrical propulsion is more useful than chemical propellants; and
(c) the time by which India will be capable of launching heavy satellites of 5-6 tonnes which ISRO are currently launching from European Space Agency's Arianne Rocket?

Answer

THE MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) Yes, Madam.

(b) Launch vehicles inject the communication satellites into an elliptical Geosynchronous Transfer Orbit (GTO). The orbit of the satellite is then raised from GTO to a higher circular orbit by imparting necessary increase in velocity using the satellite propulsion system. Presently, ISRO satellites employ Chemical Propulsion System (CPS) for the orbit raising operation. Electric Propulsion System can perform the same operation by making use of solar power and ion thrusters. The amount of propellant required to carry out such operation is much lower than the propellant required for chemical propulsion. This results in significant reduction in the lift-off mass of the satellite. However, the time required for orbit raising using electric propulsion system is much longer compared to the chemical propulsion system.

(c) The capability to launch heavy satellites of 5-6 tonnes to the Geosynchronous Transfer Orbit (GTO) will be achieved after the development and qualification of the Semi-cryogenic engine & stage are successfully completed. The Semi-cryogenic engine is under development and the first Semi-cryogenic engine hardware is expected to be qualified by 2019. The Semi-cryogenic stage using this engine is expected to be qualified for flight use by 2021.

*****